#9

PATENT
Attorney Docket No.: 019496-001810US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

EISENBERG et al.

Application No.: 09/825,242

Filed: April 2, 2001

For: SELECTION OF SITES FOR TARGETING BY ZINC FINGER PROTEINS AND METHODS OF DESIGNING ZINC FINGER PROTEINS TO BIND TO PRESELECTED SITES

Examiner: Jeffry Lundgren

Art Unit: 1631

PRELIMINARY AMENDMENT

Box Sequence
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Notice to Comply With Requirements for Patent Applications Containing Nucleotide Sequence and/or Amino Acid Sequence Disclosures and Raw Sequence Listing Error Report, mailed December 10, 2001, Applicants submit the required paper copy and computer readable copy of the Substitute Sequence Listing.

Please find enclosed a **Substitute** Sequence Listing in the paper and computer readable format to replace the original Sequence Listing referenced and paper copy mailed on August 1, 2001.

Please amend the specification in adherence with 37 C.F.R. §§ 1.821-1.825 as follows.

IN THE SPECIFICATION:

Please cancel the "SEQUENCE LISTING", previously submitted on August 1, 2001, and insert therefor the accompanying paper copy of the Substitute Sequence Listing, page numbers 1-35, at the end of the application.

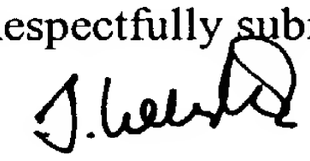
REMARKS

Applicants request entry of this amendment in adherence with 37 C.F.R. §§1.821 to 1.825. This amendment is accompanied by a floppy disk containing the above named sequences, SEQ ID NOS:1-97, in computer readable form, and a paper copy of the sequence information which has been printed from the floppy disk.

The information contained in the computer readable disk was prepared through the use of the software program "PatentIn" and is identical to that of the paper copy. This amendment contains no new matter.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Joe Liebeschuetz
Reg. No. 37,505

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PA 3195696 v1

#8

SUBSTITUTE SEQUENCE LISTING

<110> Rosenberg, Stephen P.
Case, Casey C.
Cox III, George N.
Jamieson, Andrew
Rebar, Edward J.
Sangamo Biosciences, Inc.

<120> Selection of Sites for Targeting by Zinc Finger Proteins and Methods of Designing Zinc Finger Proteins to Bind to Preselected Sites

<130> 019496-001810US

<140> US 09/825,242
<141> 2001-04-02

<160> 97

<170> PatentIn Ver. 2.1

<210> 1
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Zif268

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Glu Leu Thr Arg His Ile Arg Ile His Thr Gly Gln Lys Pro Phe Gln
20 25 30

Cys Arg Ile Cys Met Arg Asn Phe Ser Arg Ser Asp His Leu Thr Thr
35 40 45

His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys
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His Leu Arg Gln Lys
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35 40 45

Thr Arg Ser Asp Glu Leu Gln Arg His Lys Arg Thr His Thr Gly Glu
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Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met Arg Ser Asp
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35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Glu Leu Gln Arg His Gln
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Asn Lys

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<220>
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<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 51
knnknnkngg nnnknnkngg nnn

<210> 52
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 2

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 52
knnknnkngg nnknnknnkn gg

<210> 53
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 2

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 53
knnknnkngg nnnknnknnk ngg

<210> 54
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 2

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 54
knnknnkngg nggnnknnn

<210> 55
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 2

<220>
<221> modified_base
<222> (1)..(19)

<223> n = g, a, c or t

<400> 55
knnknnkngg nnknggnnn 19

<210> 56
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 2

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 56
knnknnkngg nnknnkngg 19

<210> 57
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 57
kngknnknnn nnkngknnkn nn 22

<210> 58
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>

<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 58
kngknnknnn nnnkngknnk nnn 23

<210> 59
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 59
kngknnknnn nnknnkngkn nn 22

<210> 60
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 60
kngknnknnn nnnknnkngk nnn 23

<210> 61
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 61
kngknnknnn nnknnknnkn gk. 22

<210> 62
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 62
kngknnknnn nnnknnknnk ngk 23

<210> 63
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 63
knnkngknnn nnkngknnkn nn 22

<210> 64
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 64
knnkngknnn nnnkngknnk nnn 23

<210> 65
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 65

knnkngknnn nnknnkngkn nn 22

<210> 66
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 66
knnkngknnn nnnknnkngk nnn 23

<210> 67
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 67
knnkngknnn nnknnknnkn gk 22

<210> 68
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 68
knnkngknnn nnnknnknnk ngk

<210> 69
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 69
knnknnkngk nnkngknnkn nn

<210> 70
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 70
knnknnkngk nnnkngknnk nnn 23

<210> 71
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 71
knnknnkngk nnknnkngkn nn 22

<210> 72
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 72
knnknnkngk nnnknnkngk nnn 23

<210> 73
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA

motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 73
knnknnkngk nnknnknnkn gk

22

<210> 74
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 74
knnknnkngk nnnknnknnk ngk

23

<210> 75
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 75
knnknnkngk ngknnknnn

19

<210> 76
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 76
knnknnkngk nnkngknnn 19

<210> 77
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 77
knnknnkngk nnknnkngk 19

<210> 78
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA ZFP target segment FAD 1

<400> 78
gaggtagagg 10

<210> 79
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 2

<400> 79

gtcgtgtgga 10

<210> 80
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 3

<400> 80
gttgaggaag 10

<210> 81
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 4

<400> 81
gaggtggaag 10

<210> 82
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 5

<400> 82
taggtggtga 10

<210> 83
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:test sequence

<400> 83
agtgcgcggt gc 12

<210> 84
<211> 10
<212> DNA
<213> Artificial Sequence

<220>

[redacted]

<223> Description of Artificial Sequence:target site with base immediately to the 3' side of target site

<400> 84
agtgcgcggt 10

<210> 85
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site with base immediately to the 3' side of target site

<400> 85
gtgcgcggtg 10

<210> 86
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site with base immediately to the 3' side of target site

<400> 86
tgcgcggtgc 10

<210> 87
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site with base immediately to the 3' side of target site

<220>
<221> modified_base
<222> (10)
<223> n = undefined

<400> 87
gcgcggtgcn 10

<210> 88
<211> 7

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F3 for
ordered output from optimal design target site

<400> 88
Glu Arg Asp His Leu Arg Thr
1 5

<210> 89
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F2 for
ordered output from optimal design target site

<400> 89
Arg Ser Asp Glu Leu Gln Arg
1 5

<210> 90
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F1 for
ordered output from optimal design target site

<400> 90
Arg Lys Asp Ser Leu Val Arg
1 5

<210> 91
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger for
disordered output from optimal design target site

<400> 91
Arg Ser Asp Glu Leu Thr Arg
1 5

<210> 92
<211> 7
<212> PRT

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger for
disordered output from optimal design target site

<400> 92
Arg Ser Asp Glu Arg Lys Arg
1 5

<210> 93
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:three finger
ZFP design using F3, F2 and F1 fingers for ordered
output from optimal design target site

<400> 93
Arg Lys Asp Ser Leu Val Arg Arg Ser Asp Glu Leu Gln Arg Glu Arg
1 5 10 15

Asp His Leu Arg Thr
20

<210> 94
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2 and F3) from SBS design GR-223

<400> 94
Arg Ser Ala Asp Leu Thr Arg Arg Ser Asp His Leu Thr Arg Glu Arg
1 5 10 15

Asp His Leu Arg Thr
20

<210> 95
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2 and F3) from Zif 268

<400> 95
Arg Ser Asp Glu Leu Thr Arg Arg Ser Asp His Leu Thr Thr Arg Ser

35

1 5 10 15

Asp Glu Arg Lys Arg
20

<210> 96
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2, F3) from SP1

<400> 96
Lys Thr Ser His Leu Arg Ala Arg Ser Asp Glu Leu Gln Arg Arg Ser
1 5 10 15

Asp His Leu Ser Lys
20

<210> 97
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2, F3) from SBS design GL-8.3.1

<400> 97
Arg Lys Asp Ser Leu Val Arg Thr Ser Asp His Leu Ala Ser Arg Ser
1 5 10 15

Asp Asn Leu Thr Arg
20